29421

CALIBRATION CHARTS
for
RADIO INTERFERENCE
ANALYZER/RECEIVER

MODEL NM–17/27

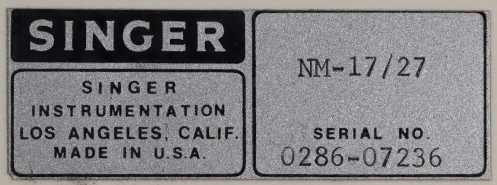
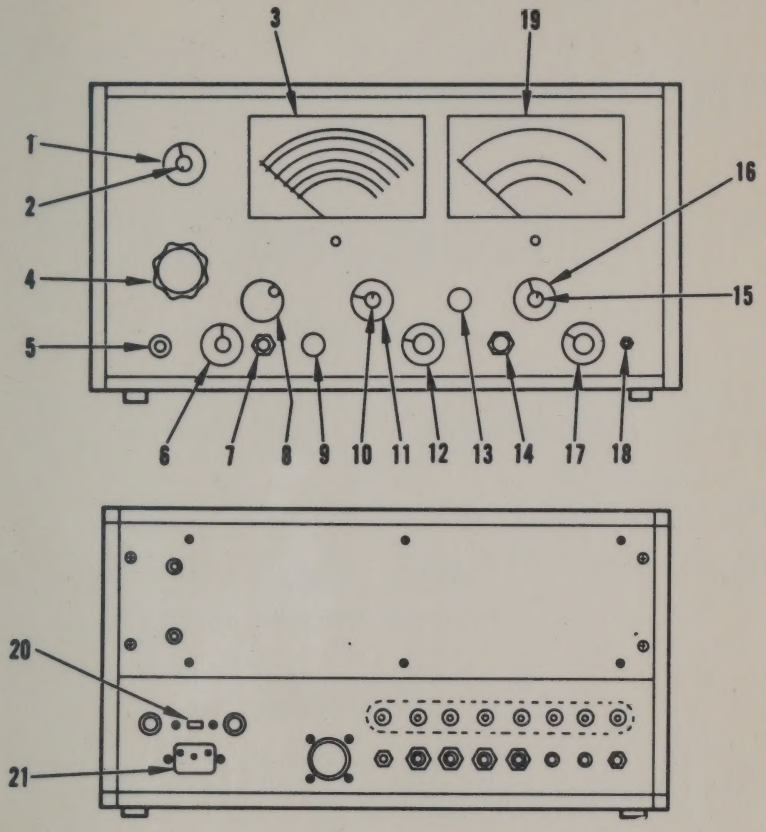


Chart No. 1–403550–001

THE SINGER CO.
SINGER INSTRUMENTATION
LOS ANGELES OPERATION
5340 Alla Road
Los Angeles, California 90066

NM-17/27 OPERATING INSTRUCTIONS



GENERAL INSTRUCTIONS

All Measurements:

Operation From AC Source:

1. Connect the ac power cable to the ac power receptacle (21) and the power source. CAUTION: Check that the 115/230 V switch (20) is set to proper position for the power source used.
2. Set the POWER switch (17) to the ON AC position.

Operation From Internal Battery:

Set the POWER switch (17) to the BATT TEST position and set the toggle switch (18) to the + and - positions to check the battery condition on the panel METER (19). In both positions the METER (19) should indicate above the RECHARGE zone of the battery scale. If the indication falls below, either + or -, the battery should be charged before using.

Conducted Measurements:

Connect an RF cable between the RF INPUT receptacle (5) and the signal source. The signal source should have a 50 ohm impedance for maximum measurement accuracy.

Radiated Measurements:

Use the 91933-2 tripod for mounting antennas for radiated measurements. Connect an RF cable between the RF INPUT receptacle (5) and the antenna receptacle. Charts 1 and 2 provide Antenna Correction Factor (ACF) data for the standard NM-17/27 antennas.

Calibration:

This equipment has been calibrated in terms of rms of a sine wave (0.707 of true peak of a sine wave). Peak values are therefore in terms of rms of a sine wave which would have the same peak amplitude as the signal that appears at the second detector input.

SIGNAL SEARCH

1. Set the ATTENUATOR (4) to -40 dB, the FUNCTION switch (12) to 0.05 PEAK, the BANDWIDTH (kHz) switch (1) to 50, the AFC switch (11) to OFF and the CONTROL MODE switch (6) to LOCAL. Set CALIBRATE control (9) for an "on scale" METER (19) indication on internal noise.
2. Connect the signal source or antenna to the RF INPUT (5) and adjust the TUNE control (8) slowly through the frequency range, while observing meter deflection. FINE TUNE control (10) is used for final tuning when a signal is found.
3. Automatic scan can be obtained by setting the CONTROL MODE switch (6) to the SCAN position and pressing pushbutton switch (7).
4. Use BAND (MHz) control (2) to change frequency range.

GAIN CALIBRATION

After tuning to the desired measurement frequency:

1. Set the FUNCTION switch (12) to CALIBRATE and the CONTROL MODE switch (6) to LOCAL.
2. Adjust the CALIBRATE control (9) for a METER (19) indication corresponding to the dB value listed below for the frequency band in operation.

Band	Calibration Figure, dB	Band	Calibration Figure, dB
.01 – .25	30.00	2 – 4	30.25
.25 – .5	30.00	4 – 8	30.25
.5 – 1	30.00	8 – 16	30.00
1 – 2	30.00	16 – 32	29.00

NARROWBAND SIGNAL MEASUREMENT

1. Set the BANDWIDTH (kHz) switch (1) to 0.1, 1.0 or 10.
2. Set the FUNCTION switch (12) to FIELD INTENSITY.

3. Rotate the AFC switch (11) to OFF position.
4. Adjust the TUNE control (8) for a signal indication on METER (19). Adjust the FINE TUNE control (10) for maximum signal indication. Adjust the ATTENUATOR (4) as necessary for a METER (19) indication in upper portion of the scale.
5. Calibrate the gain at the signal frequency.
6. Add the METER (19) indication in dB to the ATTENUATOR (4) setting in dB for a measurement in terms of dB above 1 uV across 50 ohms. Add the RF cable loss in dB from Chart 5. Add the ACF in dB for the applicable antenna (Chart 1 or 2) for RF Field Strength measurements in terms of dB above 1 uV/meter.
7. For unmodulated or lightly modulated sine wave signals algebraically add the METER (19) indication in -dBm to the ATTENUATOR (4) setting in dB to obtain a measurement in terms of dB referred to one milliwatt (dBm).
8. When a sine wave signal is being measured in the FIELD INTENSITY function in the presence of internal receiver noise or ambient interference of random nature, it is possible to determine the actual value of the signal with Chart 3.
9. Use Chart 4 to convert dB above 1 uV terms to uV terms, if required.

BROADBAND SIGNAL MEASUREMENT

1. Set the BANDWIDTH (kHz) switch (1) to 50 for signal frequencies above 2 MHz and to 10 below 2 MHz.
2. Set the FUNCTION switch (12) to PEAK with HOLD TIME of 0.05, 0.3 or 3.0, depending on signal repetition rate.
3. Rotate the AFC switch (11) to OFF position.
4. Adjust the TUNE control (8) as required for maximum METER (19) indication to the Broadband signal. Adjust the ATTENUATOR (4) as necessary for a METER (19) indication in upper portion of the scale.
5. Calibrate the instrument gain at the signal frequency.
6. For measurements made with 50 kHz bandwidth, add the METER (19) indication in dB to the ATTENUATOR (4) setting in dB to obtain the signal level in dB above 1 uV/50 kHz across 50 ohms; then add 26 dB to obtain the signal level in terms of dB above 1 uV/MHz. For measurements made with 10 kHz bandwidth, add the METER indication in dB to the ATTENUATOR (4) setting in dB to obtain the signal level in dB above 1 uV/10 kHz across 50 ohms; then add 40 dB to obtain the signal level in terms of dB above 1 uV/MHz. Add the ACF in dB for the applicable antenna (Chart 1 or 2) for RF Field Strength measurements in terms of dB above 1 uV/meter/MHz.
7. Use Chart 4 to convert dB above 1 uV terms to uV terms, if required.

SLIDEBACK PEAK OPERATION

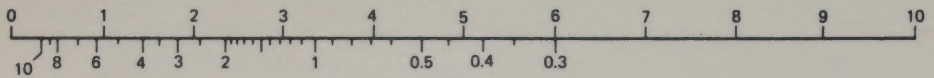
Narrowband and broadband signals may be measured using the SLIDEBACK PEAK detector function.

1. Calibrate the instrument gain at the signal frequency.
2. Set the BANDWIDTH (kHz) switch (1) to 0.1, 1.0 or 10 for narrowband and to 10 or 50 for broadband measurements.
3. Set the FUNCTION switch (12) to SLIDEBACK PEAK.
4. Rotate the AFC switch (11) to OFF position.
5. Rotate the PEAK SLIDEBACK control (13) fully counterclockwise. Connect headphones to AUDIO jack (14). Set AUDIO switch (16) to AM and adjust the AUDIO GAIN control (15) for a convenient sound level.

6. Rotate the SLIDEBACK PEAK control clockwise until the signal tone in the headphones is just cut off. Adjust the ATTENUATOR (4) as required.
7. Adjust the FINE TUNE control (10) for maximum METER (19) indication at signal threshold. Tuning is not required for broadband signals. Note the METER indication in dB at the threshold level.
8. Add the METER (19) indication in dB to the ATTENUATOR (4) setting in dB for a narrowband measurement in terms of dB above 1 uV across 50 ohms. Add the METER (19) indication in dB to the ATTENUATOR (4) setting in dB for a broadband measurement in terms of dB above 1 uV/10 kHz or dB above 1uV/50kHz, depending on bandwidth used. Add 40 dB (if 10 kHz BW is used) or 26 dB (if 50 kHz BW is used) to obtain a broadband signal level in terms of dB above 1 uV/MHz. Add the ACF in dB for the applicable antenna (Chart 1 or 2) for RF Field Strength measurements in dBuV/m or dBuV/m/MHz terms.
9. Use Chart 4 to convert dBuV terms to uV terms, if required.

Correction Chart for Sine Wave Signals in the Presence of Internal Receiver Noise or Ambient Interference of Random Nature

dB INCREASE IN METER INDICATION OVER
NOISE LEVEL WHEN SIGNAL IS APPLIED



dB TO BE SUBTRACTED FROM METER INDICATION
OF SIGNAL PLUS NOISE TO OBTAIN SIGNAL LEVEL

Example

Noise alone	10dB
Noise plus signal	12dB
Increase in meter indication (12dB-10dB)	2dB
dB to be subtracted (from Chart)	2.6dB
Signal level equals:	12dB – 2.6dB = 9.4dB

CHART 3

Conversion Chart
dBuV versus uV

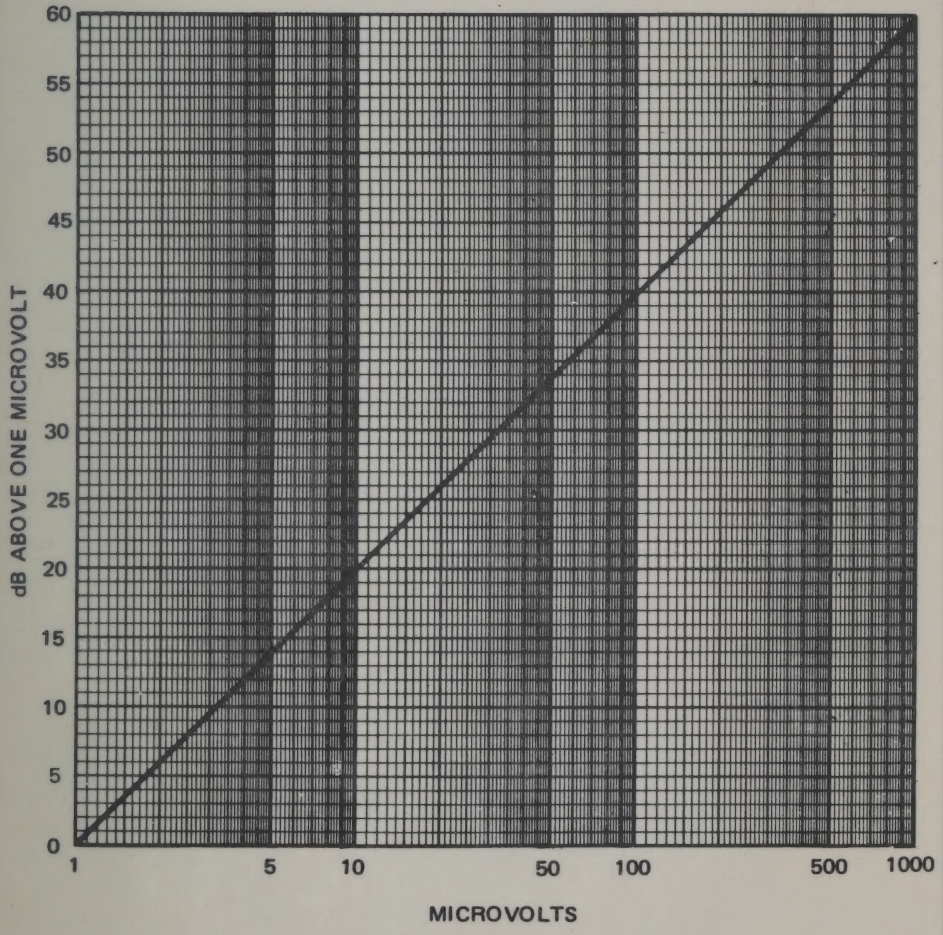


CHART 4